

SPECIFIC URINARY TRACT INFECTIONS

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Definitions:

Non Specific UTI:

Group of diseases affecting the U.T. that have nearly similar clinical manifestations and caused by certain organisms.

Specific UTI:

Group of diseases affecting the U.T. that have different special clinical manifestations and caused by specific organisms.

Types of SPECIFIC UTIs

- ***BACTERIAL:*** T.B., Gonorrhea
- ***PARASITIC:*** Bilharziasis , Filariasis, Trichomonous Vaginalis , Echinococcosis (hydatid)
- ***SPIROCHETE:*** Syphilis
- ***VIRAL:*** A I D S, Herpes
- ***FUNGUS:*** Candidiasis

GENITO-URINARY T.B.

Def.: Ch. Specific granulomatous inflammation affecting some or all organs of the genito-urinary tract.

Incidence:

- **10 million new cases world wide /year**
- **10% of pulmonary T.B.**
- **Globally, TB is the most common opportunistic infection in AIDS patients**
- **Age: 20-40 years. Sex: ♂:♀ = 2:1**
- **Bilateral renal TB: 10% early & 50% in late stages.**

Predisposing factors:

Over-crowdedness, malnutrition, trauma, corticosteroids, debilitating diseases, diabetes, immunosuppressive therapy, and AIDS

Organism: M. tuberculosis human type, Gm +ve, acid fast bacilli, stained with Ziel-Neelsen stain.

PATHOGENESIS:

Initial infections are acquired by inhalation → pulmonary alveoli → blood stream → Pyl focus in lungs, tonsils, intestine, L.N., or bone.

Primary Genitourinary TB is usually caused by metastatic spread of organisms through the blood stream during the initial infection.

The kidney & possibly the prostate are the primary site of genito-urinary T.B.

All other genito-urinary organs become involved either by ascent (prostate → bladder) or descent (kidney → bladder) or direct (epididymis → testis).

Later, active disease results from the reactivation of initial infection, probably owing to failure of the local immune response in presence of a predisposing factor.

RENAL TUBERCULOSIS

- Renal TB is usually caused by the activation of a prior blood-borne metastatic renal infection.
- T.B. bacilli reach the cortex then to medulla (tip of papillae) where they form tubercles which caseate → ulceration (cavitation) & reinfection descending to ureter & bladder.
- Caseating granulomas develop and consist of Langhans giant cells surrounded by lymphocytes and fibroblasts.
- The course of the infection depends on the infecting dose, the virulence of the organism, and the resistance of the host. If the bacterial multiplication is checked, tubercles are replaced by fibrous tissue, but if they continue to multiply, they produce a central area of caseous necrosis

PATHOLOGICAL TYPES

- Acute miliary T.B.: in children & adults of low resistance. Bilateral and fatal.
- Ulcero-cavernous T.B.: Tubercles → caseation → ulceration & fibrosis → obstructed calyces → cavity formation.
- T.B. pyonephrosis: fully developed ulcerocavernous lesion, with simultaneous partial obst. Of the ureter by debris and caseous material.
- T.B. hydronephrosis: Partial ureteral obst. + early ulcerocavernous lesion confined to one area with predominance of back-pressure atrophy.
- T.B. nephrocalcinosis (putty kidney): calcium salts being deposited as tubercles.
- Indurated (fibrous) type: The healing process results in epithelial nodules with no tendency for caseation surrounded by fibrous tissue → small contracted kidney.
- T.B. autonephrectomy: Massive fibrosis & calcification, The fibrous tissue causes strictures in the calyceal stem or at the pelviureteral junction → calcified mass of caseous material.

Tuberculosis of the ureter

- Always an extension of the disease from the kidney. The site most commonly affected is the ureterovesical junction.
- Occasionally, the whole ureter is involved with ulcers & fibroids.

- Stricture of the ureter frequently occurs during treatment, leading to fibrosis and scarring
- Ureter is short, rigid & thickened (Pipe stem). Proximal part slightly dilated & distal part is strictured.

Tuberculosis of the bladder

- Secondary to renal TB.
- The earliest forms of infection start around one or another ureteral orifices, which becomes red, inflamed, and edematous.
- As the area of mild inflammation progresses, bulbous granulations appear and may completely obscure the ureteral orifice

Tuberculosis cystitis

- Tuberculous ulcers: Results from breakdown of the tubercles. In close proximity the ureteral orifices, superficial, with irregular outline, undermined edge, necrotic caseated floor, usually surrounded by raised granulations.
- Fibrosis starts around the ureteral orifice, which contracts and can either produce a stricture or become withdrawn, rigid, and dilated, assuming the classic golf-hole appearance

T.B. of the prostate, S.V. & Vas

- TB of the prostate is rare
- The route of infection is through the hematogenous spread of organisms.
- The gland is nodular, tender, and rarely enlarged. Soft areas are extremely uncommon.
- Ipsilateral seminal vesicle indurated, thickened & fixed
- Ipsilateral vas is beaded.

Tuberculosis of epididymis

- The commonest site of genital T.B. is the epididymis
- Many men with genital TB have M. tuberculosis in the semen, however, transmissions of genital TB from male to female is very rare.
- Multiple nodules coalesce together, breakdown → cold abscess, May open on posterior aspect of scrotum → sinus (D.D. from Syphilis sinus)
- The disease usually develops in young, sexually active males.
- Route of infection: mostly blood-borne because of the extensive blood supply of the epididymis, particularly the globus minor.

T.B. OF THE TESTIS

- Secondary to infection of the epididymis → painful, inflamed scrotal swelling, sometimes with cutaneous sinus opening post.
- Sympathetic hydrocele is common due to irritation of tunica vaginalis
- The diagnosis is made by culture of M. tuberculosis from a discharging sinus or after epididymectomy.

Tuberculosis of the penis

- Primary TB of the penis occurs after coital contact with organisms already present in the female genital tract or by contamination from infected clothing
- In most cases, the lesion appears as superficial ulcer of the glans. Rarely, the lesion occurs as a solid nodule
- The diagnosis is confirmed by biopsy

Tuberculosis of the Urethral

- From another focus in the genital tract.
- In the acute phase, there is a urethral discharge with involvement of the epididymis, prostate, and other parts of the renal tract.
- In the chronic condition, diagnosis is difficult, because the disease occurs as a urethral stricture.

COMPLICATIONS OF GENITO-URINARY T.B.:

- Renal Failure: from destruction of renal parenchyma, pyonephrosis, or calcifications.
- Stricture ureter or urethra.
- T.B. Prostate → perineal sinus
- T.B. epididymitis → scrotal sinus
- BiL obstruction of epididymal ducts → sterility
- Death in milliary type.

DIAGNOSIS OF T.B.

- Very uncommon in children < 5 years because the symptoms of renal TB do not appear for 8 to 10 years after the primary infection.
- History: mostly middle aged ♂ with P.H. of pulm. TB.
- C/P: General: Pallor, night fever & sweating, loss of weight, anorexia.

Urinary:

- vague, long-standing urinary symptoms for which there is no obvious cause.
- Frequent micturition, at first only at night but later during the day as well
- The urine is sterile
- Overt hematuria (10%), microscopic hematuria (50%). Renal and suprapubic pain (strangury)
- Repeated attacks of hematospermia.

Laboratory:

- Tuberculin Test: good -ve test
- Three consecutive early morning specimens of urine should be stained with Zeihl-Neelsen stain & cultures onto Lowenstein-Jensen culture medium.
- High-performance liquid chromatography (HPLC): offers rapid and easy identification

Plain x-ray:

- **Calcification in the renal areas and in the lower genitourinary tract**
In T.B, all calcification is intraluminal and appears as a cast of the ureter, which is thickened and not dilated. In schistosomiasis, the calcification is mural and the ureter is generally dilated and tortuous.

IVU:

The renal lesion may appear as

- a distortion of a calyx
- a calyx that is fibrosed and completely occluded (lost calyx from infundibular stenosis).
- multiple small calyceal deformities.
- severe calyceal and parenchymal destruction
- Tuberculous ureteritis is manifested by dilatation above a ureterovesical stricture or, if the disease is more advanced, by a rigid fibrotic ureter with multiple strictures

- **Cystogram:**

Small and contracted (thimble bladder) or irregular, with bladder asymmetry.

- **Cystoscopy:**

Early: TB ulcers.

Late: Golf-hole ureteric orifices.

a diffuse velvety inflamed bladder with a capacity of < 100 ml.

TREATMENT

MEDICAL TREATMENT:

Improvement of general condition by good nutrition, high protein diet, exposure to sun rays.

- The first-line antituberculous drugs are isoniazid (INH), rifampicin, pyrazinamide, streptomycin, and ethambutol. The first four drugs are bactericidal.
- Why multidrug treatment?
 - To ↓ the duration of therapy
 - ↓ development of drug-resistant organisms.
 - The duration of treatment ↓ from 2 ys. to < 6 months.
- *All the drugs should be administered in one dose, and they may be taken together at night just before bedtime.*

SURGICAL TREATMENT OF T.B.

All patients should have at least 4 weeks of extensive chemotherapy before surgery

I. EXCISION OF DISEASED TISSUE

NEPHROURETRECTOMY: Indications

- (1) a nonfunctioning kidney with or without calcification.
- (2) extensive disease involving the whole kidney, together with hypertension and ureteropelvic junction (UPJ) obstruction.
- (3) coexisting renal carcinoma.

PARTIAL NEPHRECTOMY:

Indications:

- (1) Localized polar lesion containing calcification that has failed to respond after 6 weeks of intensive chemotherapy.
- (2) An area of calcification that is slowly increasing in size and is threatening to gradually destroy the whole kidney

ABCESS DRAINAGE:

The contents of an abscess can be aspirated under US or C-T guidance.

EPIDIDYMECTMY: Indications

- Caseating abscess that is not responding to chemotherapy.
- A firm swelling that has remained unchanged or has slowly increased in size despite the use of antibiotics and antituberculous chemotherapy.

Orchidectomy: if the fistula is involved (5%)

II. RECONSTRUCTIVE SURGERY

Ureteric Strictures

- Stricture at PUJ: Pyeloplasty using Anderson-Hynes technique or the Culp technique.
- Strictures at the middle third Davis intubation ureterostomy or
Passage of a double-J stent from the bladder
- Strictures lower end: if there is deterioration or no improvement after a 6-week period of chemotherapy + corticosteroids, surgical reimplantation is carried out. Double-J catheter drainage may be used

If the stricture is longer than 5 cm → Psoas hitch or Boari flap procedure

If an extensive stricture involved one or both ureters: Trans-uretero-ureterostomy.

Augmentation Cystoplasty

- For contracted bladder, in presence of an intolerable frequency of micturition both day and night, together with pain, urgency, and hematuria

SYPHILIS

Cause: Spirochaete *Treponema Pullidum*

- **Route:** sexually trans. disease
- **Pathology:** I. P. 2-4 weeks
- **Pry lesion:** Chancre on glans, penis, scrotum, or suprapubic
- **Tertiary lesions:**

Gumma of testis (D.D. from T.)

Scrotal sinus: on ant. Wall (D.D. from T.B. sinus)

Neurogenic bladder: Tabes dor. → sensory atonic bladder

Diagnosis

- **History, S.&S.**
- **Dark field smear:** Cork screw motility

BL Samples must be taken at midnight - Eosinophilia

Plain x-ray: may reveal calcified worms.

Lymphangiography: dye in urinary system.

- **Medical Management:**

Diethylcarbamazine (Hetrazan) 6 mg/kg/day in three divided dose for 2 weeks

Ivermectin in a single oral dose of 200 to 400 µg/kg

- **Surgical Management:** to remove tissue and to reconstruct the scrotum or vulva

ECHINOCOCCOSIS (Hydatid disease)

- **Parasitic infection** caused by the larval stage of the tapeworm *Echinococcus granulosus*.

- **Definitive host:** intestine of dogs.

- **Intermediate hosts:** sheep, pigs, or humans

Ingest grass contaminated by the ova in dog feces.

Larvae enter the systemic circulation and infect the kidneys. The larvae undergo vesiculation vesiculation & form hydatid cysts.

C/P: asymptomatic or a flask mass, dull pain, or hematuria the cyst may rupture late the collecting system, → colic and passage of debris resembling grape skins in the urine (hydatiduria)

Diagnosis

- **Urine:** identifying daughter cysts, or wall of the cyst.
- **Blood:** complement fixation, Hydatid Arc (HA) & Casoni test
- **Plain X-ray:** Calcified wall of the cyst
- **IVU:** thick-walled cystic mass
- **US:** multicystic or multiloculated mass

Treatment:

- **Mebendazole** (not effective)
- **Nephrectomy:** for large cysts (unilat.).
- **BiL** → Intracystic injection of H₂O₂ or conc. Saline to kill the parasite.

Fungal Infections of U.T.

Two types:

- **Primary:** Blastomycosis, Coccidiomycosis, Histoplasmosis.
- **Opportunistic:** Aspergillosis, Candidiasis, Cryptococcosis

CANDIDIASIS

Predisposing factors: prolonged use of antibiotics, D.M.

Corticosteroids, Immunocompromised host, Indwelling catheters

Diagnosis:

History of predisposing factors.

Fungal cystitis: irritative symptoms, +ve urine culture for fungus, -ve bacterial & acid-fast cultures,

Cystoscopy & biopsy to exclude Tumour.

- **Renal or systemic inf. Renal pain, with fever, Chills, hypotension→BL Cultures, ophthalmologic ex., S. agglutination titres: help in diagnosing**
- **IVU: Calyceal defects or ureteral obst.**

Treatment:

- **Correction of predisposing factors. + Alkalanization of urine**
- **Cystitis: Intravesical Amphotericin B (100 mg), Miconazole 50 mg/day**
- **Renal or systemic: Fluconazole (Diflucan)
Amphotercin B (Fungizone)**
- **Surgical: Ureteroscopic or PCN extraction of fungus ball & irrigation of U.T.**

Gonococcal urethritis

	Gonococcal	Non-gonococcal
Epidemiology	Lower socioeconomic group	Higher socioeconomic group
Pathogen	N. Gonorrhea	Chlamydia T., U.urealyticum, Trichomonas, herpes
Incubation P.	1-14 days (usually 2-5 d)	1-5 weeks
Discharge	Thick, profuse, Yellowish	Thin, Scanty, Whitish
Gram stain	G-ve intracell. Diplococci	-ve, except for inflame. Cells
Treatment	Penicillin, Ceftriaxone, Ofloxacin	Tetracycline, Doxycycline, Erythromycin, Ofloxacin

GOOD LUCK

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